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IT project management resources and capabilities: a Delphi study

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Abstract

Purpose – The purpose of this paper is to identify the most important IT project management resources and capabilities, and rank them according to the extent to which they are valuable, rare and inimitable.

Design/methodology/approach – Using a Delphi methodology, the data collection process was conducted with the collaboration of members of academia and professionals with expertise in IT project management.

Findings – The top ten most important resources/capabilities in IT project management were identified, the majority of which were capabilities; 80 per cent of the identified resources/capabilities were the same in the panel comprised of members of academia and the panel of professionals. Results showed that the two most valuable, rare and inimitable IT project management resources/capabilities were: the capability to understand and manage the needs, expectations, priorities and interests of project stakeholders; and the firm's capability to align IT projects to the strategy and business objectives of the organization.

Practical implications – This research guides managers in the development of key IT project management intangible resources/capabilities.

Originality/value – By simultaneously identifying a bundle of important IT project management resources/capabilities, evaluating the extent to which each resource/capability is valuable, rare and inimitable as well as displaying coherence between the results from the different steps of the Delphi method, the resources/capabilities identified in this study are likely to be those few that actually can influence the competitive advantage of the firm. Also, by demonstrating the less important role played by IT resources/capabilities, this study demonstrates that project management is a field of its own.

Keywords Organizations, Project management, Information technology, Resources, IT project management, Delphi, Capabilities

Paper type Research paper

1. Introduction

Project management is a key component in the success of information technology (IT) in organizations (Stewart, 2008). Some authors have also argued that in certain situations, IT project management can also become a source of competitive advantage (Basu and Muylle, 2007; Ross *et al.*, 2006). Nonetheless, despite its critical role, the literature also reveals that many IT projects still fail or do not reach completion while IT expenses continue to increase (Jeffery and Leliveld, 2003). Furthermore, to this day, there is still no consensus in the literature as to what are the critical success factors of IT project management. The objective of this research is hence to address this gap in the literature. More precisely, this study, anchored on the resource-based theory of the firm (RBT) and the Delphi methodology, aims to:

(1) identify the most important IT project management resources and capabilities; and

(2) rank them according to the three characteristics proposed by Barney (1991) and Barney *et al.* (2011) to assess whether a resource/capability can improve the firm's performance and competitive advantage.

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This contribution provides new theoretical insights that will permit the development of a new instrument to assess the IT project management practices of firms. Results of this research can also guide managers in the choice of resources/capabilities they should acquire/develop to improve their IT management practices.

The remainder of the paper is organized as follow. In the next section, we synthesize the accumulated theoretical background on RBT as well as how the theory has been applied in the fields of IT and project management. Our research methodology and the results from our fieldwork are detailed in the following two sections. Then, we detail and discuss our findings. Finally, we present the research contributions, assess the limitations of the study and suggest potential avenues of future research.

2. Theoretical background: the resources-based theory of the firm and its underlying hypotheses

Penrose (1959) and then Rubin (1973) were amongst the first scholars to conceptualize firms as "resources bundles". Building on Penrose and Rubin's work, Wernerfelt (1984) later argued that firms may earn above normal returns by identifying and acquiring resources that are critical to the development of demanded products. However, as stated by Newbert (2007, p. 122) "because of the rather abstract nature of Wernerfelt's (1984) seminal work", acceptance of this theoretical perspective did not immediately gain support from academic audiences.

Barney's (1991) article entitled "Firm resources and sustained competitive advantage" is widely regarded as the first formalization of the resource-based literature into a comprehensive theoretical framework. He based his articulation of the resource-based view (which is now a theory) on two fundamental assumptions: that resources and capabilities are heterogeneously distributed among firms and are imperfectly mobile. Together, these two assumptions allow for differences in firm resource endowments to both exist and persist over time, thereby allowing for a resource-based competitive advantage. The resources of the firm include items of capital equipment, skills of individual employees, patents, brand names, etc. A capability is the capability for a bundle of resources to perform some task or activity. A capacity is, in essence, a routine, or a number of interacting routines (Grant, 1991). According to Barney (1991), firms that possess resources/capabilities that are valuable and rare can attain a competitive advantage and enjoy improved performance in the short term. For a firm to sustain these advantages over time, its resources must also be inimitable and non-substitutable.

Barney's approach has since been used to examine the empirical implications of resource-based logic for both business and corporate strategy (Barnett *et al.*, 1994; Bharadwaj, 2000; Huselid *et al.*, 1997). This approach has also been adopted by Information Systems (IS) researchers to assess the link between IT and firm performance (Santhanam and Hartono, 2003; Tippins and Sohi, 2003; Wade and Hulland, 2004; Zhu and Kraemer, 2002). For example, Bharadwaj (2000) has used RBV to classify IT resources into three complementary groups: IT infrastructure, human IT resources and IT-enabled intangibles and demonstrate that firms with high IT capability tend to outperform other firms according to several profit and cost-based performance measures. A handful of authors in the field of project management have also anchored their work on RBV. For example, Mathur *et al.* (2007), by examining the relationship between the key assets in project management and the characteristics

of the project management process, have demonstrated the importance of intangible assets and their relationship with the temporary competitive advantage of the firm.

While this approach to studying the resource-based view has much to recommend it, it has at least one important limitation. With few exceptions, this approach has focused on what is, in fact, a highly aggregated dependent variable, namely, firm performance. And while this aggregated dependent variable may be of intrinsic interest to both scholars and managers, it may not always be the best way to test RBT (Ray *et al.*, 2004). To address this issue, Ray *et al.* (2004) recently proposed a new, more appropriate way to test the implications of RBV by adopting the performance of a business process as the dependent variable, and to examine the kinds of resources/capabilities that can generate competitive advantages at this level of analysis. Business processes are actions that firms engage into accomplish some business purpose or objective (Ray *et al.*, 2004). They can be thought of as the routines or activities that a firm develops in order to get something done (Porter, 1991). This approach renders our research objective to identify the IT project management resources/capabilities that provide a competitive advantage to the firm a relevant one.

To conclude this section, it is important to note that some authors use the terms resource and capability interchangeably. However, as mentioned by Kraaijenbrink *et al.* (2010), these inclusive definitions are tricky as:

> [...] they do not sufficiently acknowledge the distinction between those resources that are inputs to the firm and the capabilities that enable the firm to select, deploy, and organize such inputs.

Furthermore, the term RBT has been increasingly used by scholars instead of resource-based view since 2001; this change in terminology can be notably observed in the 2011 special issue on RBT in the *Journal of Management*. Finally, since its creation, several spin-off perspectives have been created from RBT/RBV, most notably Grant's (1996) knowledge-based view and Teece and al's (1997) dynamic capabilities (Barney *et al.*, 2011).

3. Methodology

3.1 The Delphi method

In the 1950s, the RAND Corporation developed the Delphi technique to obtain the most reliable consensus of a group of experts (Dalkey and Helmer, 1963):

> Delphi may be characterized as a method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem. To accomplish this "structured communication" there is provided: some feedback of individual contributions of information and knowledge; some assessment of the group judgment or view; some opportunity for individuals to revise views; and some degree of anonymity for the individual responses (Linstone and Turoff, 1975).

By using a series of questionnaires interspersed with controlled opinion feedback, researchers employ this method primarily in cases where judgmental information is indispensable (Rowe *et al.*, 1991). One of the key advantages of this approach is that it avoids direct confrontation of the experts (Dalkey and Helmer, 1963). The Delphi method is also a stronger methodology than the traditional survey for a rigorous query of experts and stakeholders on complex issues. Indeed, it is flexible in its design, open to follow up interviews and serves the dual purpose of soliciting opinions form experts and having them rank them according to their performance (Okoli and Pawlowski, 2004).

Finally, as demonstrated by various researchers in the field of IS, the Delphi method can be use to:

- forecast and identify/prioritize issues; as well as
- to develop concepts/frameworks (Okoli and Pawlowski, 2004).

For example, Brancheau *et al.* (1996) have used this methodology to identify the most critical issues facing IS executives in the coming three to five years while Bacon and Fitzgerald (2001) adopted it to develop a framework of the main areas of the IS field. In the context of this research, the Delphi method will be used to both identify the most important resources/capabilities in IT project management as well as to prioritize the identified resources/capabilities according to their possible impact on the firm's competitive advantage. Four reasons made this method the most appropriate to attain our research objectives. First, the complexity of the subject requires the knowledge of experts in the field that understand the different stakes related to resources/capabilities in IT project management. Second, a panel study is more appropriate to respond to the research question than the single view of one expert. Third, the method requires a modest number of experts per panel (between ten and 18 person/panel). Fourth, the flexible and adaptive design of the method enables a more complete information collection and a deeper understanding of the stakes.

3.2 Selection of experts

The steps proposed by Okoli and Pawlowski (2004) were followed to select the experts that could contribute to the study. Experts with different backgrounds including consulting, financial industry, manufacturing, and software development were identified. We first compared the qualifications of the expert candidates in order to classify them and prioritize our selection process by category. Next, the lists developed were reconciled into two aggregated lists, the first comprising members of academia and the second professionals. Each panel had to be comprised of between ten and 18 participants of which at least half of the members were experts in IT project management in order to capture both the internal and external perspective on the subject. At completion of the selection process, the panel of academia comprised 11 experts and the panel of professionals grouped 23 experts. Each panelist was contacted by phone in order to invite him to participate in the research explain the scope and objective of the study (i.e. completing between four and six questionnaires over a three month period).

3.3 Data collection in five steps

The data collection required five steps, each involving panelists' input to complete and/or comment a questionnaire. The data from each step/questionnaire was gathered through the use of a web site designed specifically for the study. Completing each questionnaire required between 15 and 30 minutes of the expert's time. Each data collection step is described below.

3.3.1 Identification of important resources/capabilities in IT project management (step 1). The aim of this first step was to identify the most important resources/capabilities in IT project management. Hence, each of the 34 panelists was asked to identify on the first questionnaire the resources/capabilities they considered the most important when managing an IT project. In total, 30 experts – 19 from the professional panel and 11 from

the academic panel – responded to the invitation. As recommended by Schmidt (1997), each expert had the task of identifying a minimum of six resources/capabilities that are important in IT project management. The experts were also asked to give a short description of each of the resource/capability they proposed.

3.3.2 Validation of the important resources/capabilities (step 2). We then consolidated all of the resources/capabilities into a single list on which a definition of each element was also provided. According to the Project Management Institute (2008), the knowledge needed to manage project overlaps two other types of knowledge: general management practices as well as application areas knowledge and practices (technical or industrial). Following this approach to describe the relationship between project management and the other disciplines, we divided the resources/capabilities on this list into three categories: project management resources/capabilities, IT resources/capabilities and organizational resources/capabilities that include general management practices. Next, we asked the 30 experts to comment on the interpretation we gave to each of the resource/capability identified in the first questionnaire as well as verify and refine if need be the three categories we proposed. At this step, experts also had the possibility to suggest additional resources/capabilities that were not identified in the first questionnaire.

3.3.3 Identification of the most important resources/capabilities (step 3). The third questionnaire presented the final consolidated list of resources/capabilities. The elements were randomly distributed to reduce any bias. The aim of this step was to identify the most important resources/capabilities in IT project management. Considering that different perspectives may arise from the different background of members of academia and professional the data collection and analyses that ensue from this step, as well as steps 4 and 5, were conducted for each panel independently. For each panel, a resources/capabilities was considered most important if it was identified by at least 50 percent of the experts. In total, 28 (18 from the professional panel and 11 from the academic panel) of the 30 experts invited took the time to complete the third questionnaire.

3.3.4 Classifying the most important resources/capabilities according to RBV criteria (step 4). In a fourth step, experts were asked to specify, on a ten-point likert scale, the extent to which each of the most important resources/capabilities identified in step 3 where valuable, rare and inimitable as well as justify their answers (Okoli and Pawlowski, 2004). Next, using the Kendall's W, we estimated the level of consensus between the members of each panel for the three RBT criteria. According to Schmidt (1997), the interpretation of Kendall's W are as follows: $0.1 < W < 0.3$: very weak agreement, $0.3 < W < 0.5$: weak agreement; $0.5 < W < 0.7$: moderate agreement; $0.7 < W < 0.9$: strong agreement and $0.7 < W < 0.9$: unusually strong agreement. In total, 24 (16 experts from the professional panel and eight experts from the academic panel) of the 28 experts invited completed the fourth questionnaire.

3.3.5 Reaching consensus (step 5). As each panel could not reach any consensus at step 4, the fifth step required experts to reevaluate the extent to which each of the most important resources/capabilities where valuable, rare and inimitable as well as justify their answers. The questionnaire distributed at this step also showed the mean of each of the three RBT characteristics for every resource/capability. Of the 24 experts solicited to answer this questionnaire, 19 (14 experts from the professional panel and five experts from the academic panel) responded to the invitation.

4. Results

This section presents the most important results of the Delphi as described in the methodology, one step at a time.

4.1 Identification of important resources/capabilities in IT project management (step 1)

Each of the 30 experts that responded to the first questionnaire identified at least six resources/capabilities they considered important in IT project management for a total of 206. The most cited resources/capabilities were "project team" cited by all the experts (100 percent), knowledge (63 percent), financial capital (by half – 50 percent), organizational culture (47 percent) and project management system (43 percent). The other 34 elements were cited by 30 percent or less of the experts. An interesting result to this first step is the fact that few resources were identified (investments and infrastructure), with an overwhelming presence of capabilities.

4.2 Validation of the important resources/capabilities (step 2)

We began step 2 by consolidating the 206 elements identified in step 1. Similar elements were combined into a single resource/capability which significantly reduced the list to 38 important resource/capabilities in IT project management. Before sending out the second questionnaire, these resources/capabilities were categorized into three groups: project management resources/capabilities (44.7 percent), organizational resources/capabilities (36.8 percent) and IT resources/capabilities (18.4 percent). Minor changes where proposed by the experts to clarify the meaning of the resources/capabilities and no element was added to the list. The finalized list of important resources/capabilities in IT project management, presented in Table I, confirms that the majority of them are capabilities.

4.3 Identification of the most important resources/capabilities (step 3)

During this step, the experts used the third questionnaire to select the IT project management resources/capabilities they deemed most important. As proposed by Okoli and Pawlowski (2004), only the elements highlighted by 50 percent or more of the experts were considered most important. As presented in Table II (scores in italics), ten elements in each panel received a score of 50 percent or higher and none of these resources/capabilities belonged to the IT resources/capabilities category. Eight of the ten elements were identified in both the academic and professional panels. Out of these eight elements, six are in the project management category and two in the organizational category. The remaining two resources/capabilities for the academia panel belonged to the organizational category:

(1) Employees knowledge of organizational processes, roles and responsibilities and well as the vision of the firm.

(2) The organization's capability to communicate at all levels, formally and informally as well as inside and outside the boundaries of the firm – while the remaining two of the professional panel belonged to the project management category:

- the financial capital available to manage the project; and
- the project team's ability to communicate.

Category of resources/ capabilities	Name
Project management	PM1 – the capability to assess project risks and implement proper measures to address them
	PM2 – the capability to understand and manage the needs, expectations, priorities and interests of project stakeholders
	PM3 – the capability to negotiate, manage, close and renew project contracts
	PM4 – the capability to consider both the product and process during quality assurance activities
	PM5 – the governance of the project by a sponsor (i.e. a top-level manager responsible of the project)
	PM6 – the presence of a project management office (PMO) in the organization
	PM7 – the financial capital available to manage the project
	PM8 – the knowledge and competencies of the project manager
	PM9 – the project management knowledge and competencies of team members involved in the project
	PM10 – the project team's ability to communicate
	PM11 – the investment to train team members in project management
	PM12 – the project team's ability to manage the project scope and change requests
	PM13 – the project team's ability to manage project delays
	PM14 – the project team's ability to express and document clear and measurable objectives
	PM15 – the proper use of IS supporting the techniques, methods and tools required in PM
	PM16 – the proper use of a project management IS (e.g. MS project)
	PM17 – the proper use of a system to evaluate and control project activities and deliverables
Organizational	O1 – the organization's capability to attract and retain qualified personnel
	O2 – the firm's capability to improve organizational processes and innovate
	O3 – the firm's capability to align IT projects to the strategy and business objectives of the organization
	O4 – the organization's capability to capture and exchange acquired knowledge
	O5 – the organization's capability to communicate at all levels, formally and informally as well as inside and outside the boundaries of the firm
	O6 – the organization's capability to identify, follow and assess achievements of project benefits
	O7 – the organization's capability to integrate and create a synergy between the various functions/departments
	O8 – the organization's capability to mobilize project teams
	O9 – the organizational culture (i.e. the values, norms, internal policies and procedures, etc.)
	O10 – the organization's ability to adapt to changes in the environment
	O11 – organizational assets (i.e. documentation, plans, practices, formal and informal procedures and practices, etc.)
	O12 – top management support, participation and effective promotion of projects

(*continued*)

Table I.
Important resources/capabilities in IT project management

Category of resources/ capabilities	Name
	O13 – employees knowledge of organizational processes, roles and responsibilities and well as the vision of the firm
	O14 – the investments in employees' professional development
IT	IT1 – the presence of a development and testing environment capable of reproducing the production environment
	IT2 – the selection of reliable, efficient, scalable technologies that are compatible with the technology infrastructure of the organization and capable of addressing business needs
	IT3 – the IT software of the organization
	IT4 – the IT hardware of the organization
	IT5 – the technical knowledge and competences of the IT resources involved in the project
	IT6 – investments in the technical training of IT resources involved in the project
	IT7 – team members' ability to resolve technical problems

Table I.

The top ten elements identified by the academic panel are all capabilities, while the professional panel identified only one resource (PM7 – the financial capital available to manage the project) in their top ten.

4.4 Classifying the most important resources/capabilities according to RBT criteria (step 4)

After asking experts to specify, on a ten-point likert scale, the extent to which each of the top ten most important resources/capabilities were valuable, rare and inimitable, we calculated the level of consensus between the members of each panel for the three RBT criteria. The six Kendall's W coefficients were below 0.45 indicating that there was at best a weak agreement between experts.

4.5 Reaching consensus (step 5)

During this last step, experts were asked to reassess the extent to which each of the top ten most important resources/capabilities were ranked according to the three RBT criteria: valuable, rareness and inimitability. As indicated in Table III, five of the six Kendall's W were above 0.7 indicating a strong agreement between the experts while the coefficients for the rareness criteria in the professional panel was 0.615 indicating a moderate agreements between the experts.

The most important IT project management resources/capabilities for each panel ranked according to three RBT attributes are presented in Table IV. The main results will be discussed in the next section.

5. Discussion

Anchored on the RBT of the firm and the Delphi methodology, the objective of this research was twofold:

(1) identify the most important IT project management resources and capabilities; and

(2) rank them according to the extent to which they are valuable, rare and inimitable.

Resources/capabilities	Panel Acad. (%)	Panel Prof. (%)
PM2 – the capability to understand and manage the needs, expectations, priorities and interests of project stakeholders	*100*	*72.2*
O3 – the firm's capability to align IT projects to the strategy and business objectives of the organization	*80.0*	*66.7*
O12 – top management support, participation and effective promotion of projects	*80.0*	*50.0*
PM1 – the capability to assess project risks and implement proper measures to address them	*70.0*	*66.7*
PM12 – the project team's ability to manage the project scope and change requests	*70.0*	*61.1*
PM5 – the governance of the project by a sponsor (i.e. a top-level manager responsible of the project)	*60.0*	*50.0*
PM14 – the project team's ability to express and document clear and measurable objectives	*60.0*	*50.0*
PM8 – the knowledge and competencies of the project manager	*50.0*	*50.0*
O13 – employees knowledge of organizational processes, roles and responsibilities and well as the vision of the firm	*70.0*	11.1
O5 – the organization's capability to communicate at all levels, formally and informally and inside and outside the boundaries of the firm	*60.0*	27.8
PM7 – the financial capital available to manage the project	30.0	*61.1*
PM10 – the project team's ability to communicate	40.0	*50.0*
PM16 – the proper use of a project management IS (e.g. MS project)	30.0	38.9
IT2 – the selection of reliable, efficient, scalable technologies that are compatible with the technology infrastructure of the organization and capable of addressing business needs	20.0	38.9
IT5 – the technical knowledge and competences of the IT resources involved in the project	20.0	38.9
O10 – the organization's ability to adapt to changes in the environment	20.0	38.9
PM9 – the project management knowledge and competencies of team members involved in the project	40.0	33.3
PM4 – the capability to consider both the product and process during quality assurance activities	40.0	27.8
O1 – the organization's capability to attract and retain qualified personnel	40.0	27.8
O6 – the organization's capability to identify, follow and assess achievements of project benefits	40.0	16.7
O11 – organizational assets (i.e. documentation, plans, practices, formal and informal procedures and practices, etc.)	40.0	11.1
PM13 – the project team's ability to manage project delays	30.0	27.8
O8 – the organization's capability to mobilize project teams	30.0	27.8
O9 – the organizational culture (i.e. the values, norms, internal policies and procedures, etc.)	30.0	22.2
PM17 – the proper use of a system to evaluate and control project activities and deliverables	30.0	16.7
PM3 – the capability to negotiate, manage, close and renew project contracts	20.0	16.7
O7 – the organization's capability to integrate and create a synergy between the various functions/departments	20.0	16.7
PM15 – the proper use of IS supporting the techniques, methods and tools required in project management	10.0	22.2
IT1 – the presence of a development and testing environment capable of reproducing the production environment	10.0	22.2

Table II.
Most important resources/capabilities in IT project management

(*continued*)

Resources/capabilities	Panel Acad. (%)	Panel Prof. (%)
IT3 – the IT software of the organization	20.0	11.1
IT7 – team members' ability to resolve technical problems	20.0	11.1
IT6 – investments in the technical training of IT resources involved in the project	10.0	5.6
PM6 – the presence of a PMO in the organization	0.0	16.7
O4 – the organization's capability to capture and exchange acquired knowledge	0.0	16.7
O14 – the investments in employees' professional development	0.0	11.1
O2 – the firm's capability to improve organizational processes and innovate	0.0	5.6
PM11 – the investment to train team members in project management	10.0	0
IT4 – the IT hardware of the organization	10.0	0

Table II.

	Statistics	Valuable	Rareness	Inimitability
Academia	N	5	5	5
	Kendall's *W*	*0.789*	*0.744*	*0.618*
	χ^2	35.487	33.480	27.807
	df	9	9	*9*
	p	0	0	0.001
Professionals	N	14	14	14
	Kendall's *W*	*0.720*	*0.615*	*0.711*
	χ^2	90.748	74.836	89.532
	df	9	9	9
	p	0	0	0

Table III.
Kendall's *W* for the tree RBT criteria in both panels

Three findings related to the attainment of the first objective merit to be highlighted here. First, the most important IT project management resources/capabilities are roughly the same in the two panels. To a certain extent, this finding implies a certain generalization of the results. Second, the majority of the most important IT project management resources/capabilities identified in this research are capabilities. This result is in line with Hansen *et al.* 's (2004) results, which conclude that what a firm does with its resources (capability) is more (or at least as) important as the resources the firm owns. Sirmon *et al.* (2007, 2011) along with Sirmon and Hitt (2003) also state that possessing a resource does not guarantee better performance as resource need to be accumulated, bundled, and leveraged, which is basically how a capability is defined. This finding is also corroborates those of Mathur *et al.*'s (2007) that suggest that intangible project management assets are a source of temporary competitive advantage while tangible project management assets are not.

Third, none of the IT resources/capabilities identified in steps 1 and 2 of the study was classified amongst the most important IT project management resources/capabilities, whether in the panel comprised of members of academia or the panel of professionals. This result provides evidence that project management is a multidisciplinary approach that is guided by the same set of principles whatever the field of application.

In pursuing our second objective we discovered that the two most important IT project management resources/capabilities – the capability to understand and manage the needs, expectations, priorities and interests of project stakeholders (PM2) and the firm's

Order of importance	More valuable to less valuable	More rare to less rare	Less imitable to more imitable
Academic panel resources/capabilities			
PM2 – the capability to understand and manage the needs, expectations, priorities and interests of project stakeholders	PM2	O3	PM2
O3 – the firm's capability to align IT projects to the strategy and business objectives of the organization	O3	PM2	O13
O12 – top management support, participation and effective promotion of projects	O12	PM1	PM1
PM1 – the capability to assess project risks and implement proper measures to address them	PM5	O5	O3
PM12 – the project team's ability to manage the project scope and change requests	PM8	PM14	O5
O13 – employees knowledge of organizational processes, roles and responsibilities and well as the vision of the firm	PM1	O12	PM14
PM5 – the governance of the project by a sponsor (i.e. a top-level manager responsible of the project)	O5	PM5	PM8
PM14 – the project team's ability to express and document clear and measurable objectives	O13	PM12	O12
O5 – the organization's capability to communicate at all levels, formally and informally and inside and outside the firm	PM12	O13	PM12
PM8 – the knowledge and competencies of the project manager	PM14	PM8	PM5
Professional panel resources/capabilities			
PM2 – the capability to understand and manage the needs, expectations, priorities and interests of project stakeholders	O3	PM14	O3
O3 – the firm's capability to align IT projects to the strategy and business objectives of the organization	PM5	PM2	O12
PM1 – the capability to assess project risks and implement proper measures to address them	PM2	O3	PM2
PM12 – the project team's ability to manage the project scope and change requests	O12	PM10	PM10
PM7 – the financial capital available to manage the project	PM1	O12	PM8
O12 – top management support, participation and effective promotion of projects	PM8	PM12	PM1
PM5 – the governance of the project by a sponsor (i.e. a top-level manager responsible of the project)	PM10	PM5	PM7
PM14 – the project team's ability to express and document clear and measurable objectives	PM14	PM1	PM12
PM8 – the knowledge and competencies of the project manager	PM12	PM8	PM14
PM10 – the project team's ability to communicate	PM7	PM7	PM5

Table IV.
Most important IT project management resources/capabilities for each panel ranked according to three RBT attributes

capability to align IT projects to the strategy and business objectives of the organization (O3) – were also ranked amongst the most valuable, the rarest and the most difficult to imitate. The first resource/capability (PM2) demonstrates that the interests of the key stakeholders or even of all stakeholders should be taken into account to make a project a success (Boddy, 2002; Wateridge, 1998). The second resource/capability denotes, as highlighted by Thomas and Mullaly (2008), the importance of aligning projects to the

organizational context and orientation. Moreover, results show that there is generally coherence between the results from the first three and the last two steps of the Delphi method. Indeed, the most important IT project management resources/capabilities are usually more valuable, rarer and more difficult to imitate. There are, however, a few exceptions. For instance, the resource/capability "the project team's ability to express and document clear and measurable objectives (PM14)" is not considered to be very important by professionals (ranked 8th), but is ranked no.1 for rareness while the resource/capability "The governance of the project by a sponsor (PM5)" is not considered to be very important by professionals (ranked 7th) but is ranked no. 2 for its value. These few discrepancies will need to be examined in the next phase of our research program.

6. Contributions, limitations and future research avenues

This research makes two theoretical contributions. First, by simultaneously identifying a bundle of important IT project management resources/capabilities, evaluating the extent to which each resource/capability is valuable, rare and inimitable as well as displaying coherence between the results from the different steps of the Delphi method, the resources/capabilities identified in this study are likely to be those few that actually can influence the competitive advantage of the firm. Hence, a logical future research initiative may be built from these results to empirically test the influence of the top IT project management resources/capabilities on the competitive advantage of a firm. Second, by demonstrating the less important role played by IT resources/capabilities, this study demonstrates that project management is a field of its own, independent to the field of application. By guiding managers in the development of key IT project management intangible resources/capabilities, this research also provides an important practical contribution.

This research has two limitations. First, this study remains the first phase of a research program that will propose and test a detailed research model on IT project management resources/capabilities. In the later phases of this research program, we plan to use the findings from this study to develop a multidimensional construct on IT project management resources/capabilities and test the causal relationship between this construct and the performance of the project management process. Second, the consensuses reached by the panel comprised of members of academia in step 5 of the Delphi method rest on the opinion of only five experts. Reaching consensuses with a group of ten or more members would have increased the external validity of the results.

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